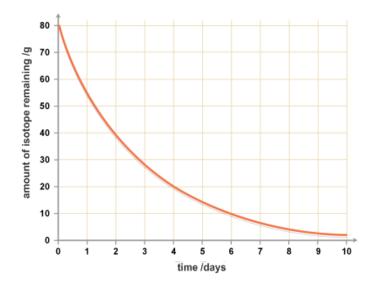
Radioactive Half-Life

The half-life of an isotope is the average time it takes for the number of nuclei of the isotope to halve.

The graph shows the amount of a particular radioactive isotope remaining in a sample over 10 days.

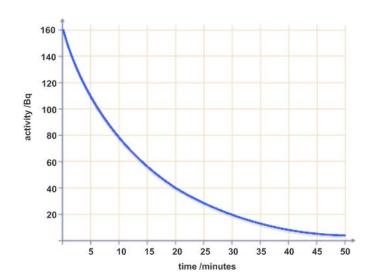
What is the half-life of the isotope?



The half-life of an isotope can **also** be found from the average time it takes for the activity to halve.

The graph shows the activity of a particular radioisotope over 50 minutes.

What is the half-life of the isotope?



- 1. If there were 5,000,000 atoms of a radioactive element in a sample, how many would be left after:
 - a. one half-life
 - b. two half-lives
 - c. three half-lives
- 2. If the half-life of a sample was 20 minutes, and the initial count rate was 8000 counts per minute, what would the count rate be after 2 hours?
- 3. What must you always remember to do to ensure count rate measurements are accurate?

Half-life homework (see pages 216-7 in textbook)

Name	•••••
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radioactive isotope	half-life	
boron-12	0.02 seconds	
radon-220	52 seconds	
iodine-128	25 minutes	
radon-222	3.8 days	
strontium-90	28 years	
radium-226	1602 years	
carbon-14	5730 years	
plutonium-239	24 400 years	
uranium-235	7.1×10^8 years	
uranium-238	4.5×10^9 years	

- 1 If samples of strontium-90 and radium-226 both had the same activity today, which would have the lower activity in 10 years' time?
- **2** If the activity of a sample of iodine-128 is 800 Bq, what would you expect the activity to be after
 - **a)** 25 minutes **b)** 50 minutes **c)** 100 minutes?
- **3** The graph on the right shows how the activity of a small radioactive sample varied with time.
 - a) Why are the points not on a smooth curve?
 - **b)** Estimate the half-life of the sample.

